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10/529,242

03/25/2005

Stephen Christopher Neil Brown

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05/07/2008

DENNISON, SCHULTZ & MACDONALD

1727 KING STREET

SUITE 105

ALEXANDRIA, VA 22314

EXAMINER

EMPIE, NATHAN H

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

05/07/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/529,242

Applicant(s)

BROWN ET AL.

Examiner

NATHAN H. EMPIE

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29, 31-33, 35 and 46-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29, 31-33, 35 and 46-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/08)
Paper No(s)/Mail Date 4/16/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/16/08 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29, 31-33, 35 and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (EP 653762 A1, hereafter '762) in view of Khoobehi et al. (US patent 5,376,086, hereafter '086).

'762 teaches a method of removing a portion of a non-metallic surface, such as concrete (12) (Abstract, Col 5 line 57 – Col 6 line 8 Fig 1),

the method comprising providing a beam of laser light (14) (Fig 1);

irradiating a location of the surface (12) with the laser light (14) (Fig 1);

'762 does not teach a shadow mask is used to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated. '086 teaches a shadow mask that is mounted and covers a peripheral part of the beam of laser light (Fig 1, 14-16, col 1 lines 14 – 23, col 5 lines 29-35) is used to remove a low power density part of the laser beam

that is below a threshold power density for surface removal before the surface location is irradiated (Fig 1, col 2 lines 25-35, Fig 13, col 7 lines 1-29). '086 teaches a laser ablation method where the incorporation of a mask possessing a plurality of etched patterns enhances the beam quality by providing a more controllable and predictable average laser power distribution (col 2 lines 35 – 68). The examiner realizes that the laser machining method taught by '086 is not applied to removing concrete surface, but the mask feature and method of using the shadow mask taught by '086 to achieve more controllable and predictable laser power distribution would transcend over controlling the output of any type of laser beam, regardless of what materials they are machining. Since '762 teaches a method of using a laser to machining a surface, it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated the shadow mask of '086 into the method described by '762, to enhance the controllability and predictability of the resulting laser beam power distribution.

Claim 31: '762 in view of '086 teaches the method of removing a portion of a concrete surface according to claim 29 (above) wherein '086 further teaches the shadow mask absorbs substantially all of that portion of the laser beam that is below the threshold power density (col 2 lines 35-50).

Claim 32: '762 in view of '086 teaches the method of removing a portion of a concrete surface according to claim 29 (above) wherein '086 further teaches the mask is a reflective mask wherein light incident on the mask is reflected by the mask (col 3, lines 18-57).

Claim 33: '762 in view of '086 teaches the method of removing a portion of a concrete surface according to claim 32 (above) wherein '086 further teaches the reflective mask redirects low power density laser light to another low power density portion of the laser beam to create an additional high power density portion of the laser beam (col 2 lines 44-50).

Claim 35: '762 in further view of '086 teach the method of removing a portion of a surface according to claim 29 (above) wherein '762 further teaches the surface portion is removed by the effects of thermal shock (col 2 line 57 – col 3 line16).

Claims 46 – 50: The only difference between claims (29, 31-33, and 35) and (46-50) respectfully is the substitution of “a concrete surface” for “a natural stone surface”. ‘762 in view of ‘086 teach the rejection to claims 29, 31-33, and 35 (above), and ‘762 further teaches that its present invention may be applied not only to concrete, but also to other materials such as stone and sandstone (col 5 lines 31 – 38).

Claims 29, 32, 33, 35, 46, and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over ‘762 in view of Neiheisel (US patent 5,736,709, hereafter ‘709).

‘762 teaches a method of removing a portion of a non-metallic surface, such as concrete (12) (Abstract, Col 5 line 57 –Col 6 line 8 Fig 1),

the method comprising providing a beam of laser light (14) (Fig 1);

irradiating a location of the surface (12) with the laser light (14) (Fig 1);

‘762 does not explicitly teach a mask is mounted to cover a peripheral part of the laser light so as to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated. ‘709 teaches a method of removing a portion of a surface (oxide layer from a metallic surface, abstract, col 2 line 65- col 3 line 5), comprising providing a beam of laser light (Fig 2 (54), (56), col 6, lines 37-67), and irradiating a location of the surface (38) with the laser light ((Fig 5-8) col 11, lines 24-27). Further ‘709 teaches wherein a mask means ((68)/(60)) is mounted and covers a peripheral part of the beam of laser light so as to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated (Fig 3, conversion of profile 58 to 64, low power density is removed, and some col 10 lines 47-67, further, any peripheral portion of laser beam wider than entry to portion 60 would be removed). ‘709 further teaches that such a mask will yield uniform spatial power distribution across the focused beam, which enables a minimum surface power density throughout the impinging the beam to remove material (col 3 lines 1 – 67). Therefore it would have been obvious to one of ordinary skill in the art at

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the time of invention to have incorporated the masking means taught by '709 into the method of '762 to generate uniform spatial power distribution across the beam, enabling a more controllable material removal process.

Claim 32: '762 in view of '709 teaches the method of removing a portion of a surface according to claim 29 (above) wherein '709 further teaches the mask is a reflective mask (68, step index optical fiber), wherein light incident on the mask is reflected (multiple internal reflections) by the mask (col 10, lines 47-67).

Claim 33: '762 in view of '709 teaches the method of removing a portion of a surface according to claim 32 (above) wherein '709 further teaches the reflection redirects low power density laser light to another low power density portion of the laser beam to create an additional high power density portion of the laser beam (Fig 3, conversion of profile 58 to 64, col 10 lines 47-67).

Claim 35: '762 in further view of '709 teach the method of removing a portion of a surface according to claim 29 (above) wherein '762 further teaches the surface portion is removed by the effects of thermal shock (col 2 line 57 – col 3 line16).

Claims 46, 48-50: The only difference between claims (29, 32-33, and 35) and (46, 48-50) respectfully is the substitution of "a concrete surface" for "a natural stone surface". '762 in view of '086 teach the rejection to claims 29, 32-33, and 35 (above), and '762 further teaches that its present invention may be applied not only to concrete, but also to other materials such as stone and sandstone (col 5 lines 31 – 38).

Claims 29, 31, 35, 46, 47, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of Ngoi et al. (US patent 6,285,002, hereafter '002).

Claim 29: '762 teaches a method of removing a portion of a concrete surface (12) (Abstract, Col 5 line 57 –Col 6 line 8 Fig 1),

the method comprising providing a beam of laser light (14) (Fig 1);

irradiating a location of the surface (12) with the laser light (14) (Fig 1);

'762 does not teach a mask means is used to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated. '002 teaches a mask means (diaphragm (5), Fig 1) is used to remove a low power density part of the laser beam that is below a threshold power density for surface removal before the surface location is irradiated (col 5 lines 32-39). '002 teaches a laser micro machining method where the incorporation of a diaphragm enhances the beam quality by eliminating the peripheral portion of the laser beam (col 5 lines 32-39). Since '762 teaches a method of laser machining a surface, it would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated the diaphragm of '002 into the method described by '762, to enhance the resulting laser beam quality.

Claim 31: '762 in view of '002 teaches the method of removing a portion of a concrete surface according to claim 29 (above) wherein '002 further teaches the shadow mask absorbs substantially all of that portion of the laser beam that is below the threshold power density (see, for example, col 5 lines 32-40).

Claim 35: '762 in further view of '002 teach the method of removing a portion of a surface according to claim 29 (above) wherein '762 teaches the surface portion is removed by the effects of thermal shock (col 2 line 57 – col 3 line 16).

Claims 46, 47, and 50: The only difference between claims (29, 31, and 35) and (46, 47 and 50) respectfully is the substitution of “a concrete surface” for “a natural stone surface”. '762 in view of '002 teach the rejection to claims 29, 31, and 35 (above), and '762 further teaches that its present invention may be applied not only to concrete, but also to other materials such as stone and sandstone (col 5 lines 31 – 38).

Response to Arguments

Applicant's arguments filed 4/25/08 have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., an encircling mask possessing a large single / central aperture) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to the applicant's arguments directed toward the applicability of combining of Li and Khoobchi are not persuasive as both prior arts are within the realm of laser machining, and Khoobchi has taught a means of increasing the controllability and predictability of a laser beams power distribution, which one of ordinary skill in the art would appreciate would transcend over the wealth of laser machining applications.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 7:00- 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. H. E./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792